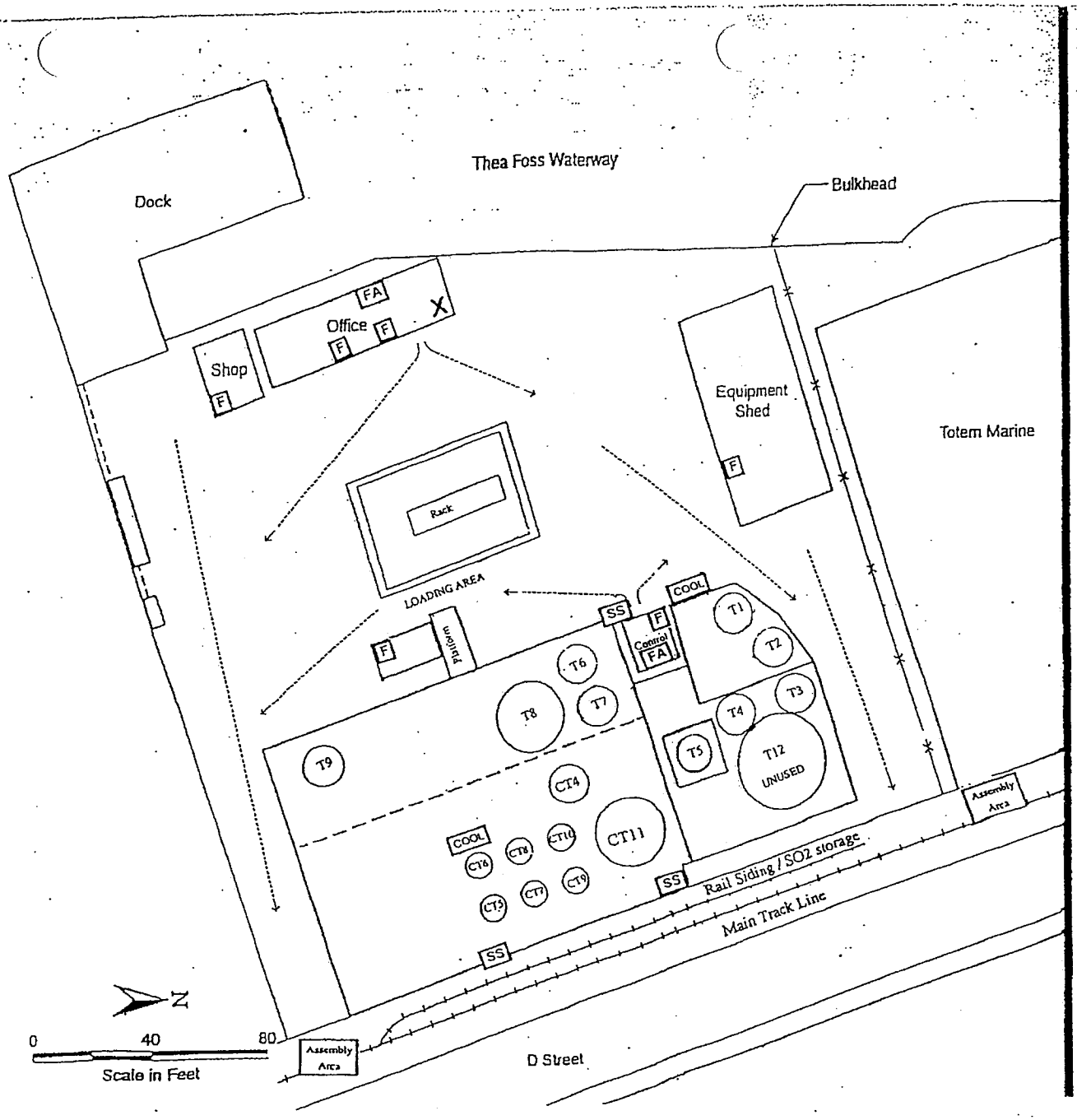

LEGEND

Evacuation Routes	———
Fire Extinguisher	F
First Aid Station	FS
Safety Shower	SS
Process Tanks	T-
Caustic Tanks	CT-
Cooling Units	COOL
MSDS Print Location	X

UNIVAR

OLYMPIC CHEMICAL
1002 East 'D' Street
Tacoma, Washington 98421

Received
7/13/2011

Emergency Evacuation and Equipment Map

Use of assembly area or alternate depends on "wind direction".....look at wind socks

2009 PHA
MAY 18-19

Worksheet

System: 1. RAIL CAR OF SULFUR DIOXIDE
Subsystem: 1. RAIL CAR OF SULFUR DIOXIDE AWAITING UNLOADING

What ifs	Hazards	Consequences	S	L	RR	Recommendations
1. Rail car securement procedures are not properly conducted (chocks, brake set , flag, etc.) ?	1. No release is anticipated.	1. Potential exposure of employees in the immediate area.				1. See the Recommendations in the Action Plan in Section 6 of this Plan.
		2. Potential for the release to spread to other on site work areas with injuries to employees.				
		3. Potential property damage, environmental impact, regulatory impact, public relations impact.				
		4. Potential for the release to migrate off site affecting public and neighboring facilities.				
2. Rail car liquid angle valves are not closed prior to removal of the plugs ?	1. Potential release of sulfur dioxide into the atmosphere.	1. Potential exposure of employees in the immediate area.	4	4	9	1. See the Recommendations in the Action Plan in Section 6 of this Plan.
		2. Potential for the release to spread to other on site work areas with injuries to employees.	5	3	9	
		3. Potential property damage, environmental impact, regulatory impact, public relations impact.	5	4	10	
		4. Potential for the release to migrate off site affecting public and neighboring facilities.	5	4	10	
3. The shell is damaged due to contaminated sulfur dioxide ?	1. Potential release of sulfur dioxide into the atmosphere.	1. Potential exposure of employees in the immediate area.	2	4	7	1. See the Recommendations in the Action Plan in Section 6 of this Plan.
		2. Potential for the release to spread to other on site work areas with injuries to employees.	3	4	8	
		3. Potential property damage, environmental impact, regulatory impact, public relations impact.	4	4	9	
		4. Potential for the release to migrate off site affecting public and neighboring facilities.	5	4	10	
4. The sulfur dioxide supply system fails (piping, valves, fittings, etc.)?	1. Potential release of sulfur dioxide into the atmosphere.	1. Potential exposure of employees in the immediate area.	4	3	8	1. See the Recommendations in the Action Plan in Section 6 of this Plan.
		2. Potential for the release to spread to other on site work areas with injuries to employees.	5	3	9	

System: 1. RAIL CAR OF SULFUR DIOXIDE
Subsystem: 1. RAIL CAR OF SULFUR DIOXIDE AWAITING UNLOADING

What ifs	Hazards	Consequences	S	L	RR	Recommendations
		3. Potential property damage, environmental impact, regulatory impact, public relations impact.	5	3	9	
		4. Potential for the release to migrate off site affecting public and neighboring facilities.	5	3	9	
5. The operator fails to notice the rail car valves are in poor condition prior to hooking up the discharge lines ?	1. Potential release of sulfur dioxide into the atmosphere.	1. Potential exposure of employees in the immediate area.	4	3	8	1. See the Recommendations in the Action Plan in Section 6 of this Plan.
		2. Potential for the release to spread to other on site work areas with injuries to employees.	5	3	9	
		3. Potential property damage, environmental impact, regulatory impact, public relations impact.	5	3	9	
		4. Potential for the release to migrate off site affecting public and neighboring facilities.	5	3	9	
8. The rail car comes into the facility with the incorrect O-rings installed in the valves/pressure release valve?	1. Potential release of sulfur dioxide into the atmosphere.	1. Potential exposure of employees in the immediate area.	3	3	7	1. See the Recommendations in the Action Plan in Section 6 of this Plan.
		2. Potential for the release to spread to other on site work areas with injuries to employees.	4	3	8	
		3. Potential property damage, environmental impact, regulatory impact, public relations impact.	5	3	9	
		4. Potential for the release to migrate off site affecting public and neighboring facilities.	5	3	9	
9. The rail car comes into the facility with a leaking valve?	1. Potential release of sulfur dioxide into the atmosphere.	1. Potential exposure of employees in the immediate area.	3	3	7	1. See the Recommendations in the Action Plan in Section 6 of this Plan.
		2. Potential for the release to spread to other on site work areas with injuries to employees.	4	3	8	
		3. Potential property damage, environmental impact, regulatory impact, public relations impact.	5	3	9	
		4. Potential for the release to migrate off site affecting public and neighboring facilities.	5	3	9	
10. An employee becomes angry and sabotages a rail car resulting in a release.	1. Potential release of sulfur dioxide into the atmosphere.	1. Potential exposure of employees in the immediate area.	1	5	5	1. See the Recommendations in the Action Plan in Section 6 of this Plan.

System: 1. RAIL CAR OF SULFUR DIOXIDE
Subsystem: 1. RAIL CAR OF SULFUR DIOXIDE AWAITING UNLOADING

What ifs	Hazards	Consequences	S	L	RR	Recommendations
		2. Potential for the release to spread to other on site work areas with injuries to employees.	2	5	8	
		3. Potential property damage, environmental impact, regulatory impact, public relations impact.	3	5	9	
		4. Potential for the release to migrate off site affecting public and neighboring facilities.	4	5	10	
11. Operator becomes incapacitated resulting in a release?	1. Potential release of sulfur dioxide into the atmosphere.	1. Potential for the release to migrate off site affecting public and neighboring facilities.	3	4	8	1. See the Recommendations in the Action Plan in Section 6 of this Plan.
		2. Potential for the release to migrate off site affecting public and neighboring facilities.	4	4	9	
		3. Potential property damage, environmental impact, regulatory impact, public relations impact.	5	4	10	
		4. Potential for the release to migrate off site affecting public and neighboring facilities.	5	4	10	
12. Operator is impaired by drugs or alcohol resulting in a release?	1. Potential release of sulfur dioxide into the atmosphere.	1. Potential for the release to migrate off site affecting public and neighboring facilities.	3	4	8	1. See the Recommendations in the Action Plan in Section 6 of this Plan.
		2. Potential property damage, environmental impact, regulatory impact, public relations impact.	4	4	9	
		3. Potential for the release to migrate off site affecting public and neighboring facilities.	5	4	10	
		4. Potential for the release to migrate off site affecting public and neighboring facilities.	5	4	10	
13. The rail car is punctured by vandals?	1. Potential release of sulfur dioxide into the atmosphere.	1. Potential for the release to migrate off site affecting public and neighboring facilities.	1	5	5	1. See the Recommendations in the Action Plan in Section 6 of this Plan.
		2. Potential property damage, environmental impact, regulatory impact, public relations impact.	2	5	8	
		3. Potential for the release to migrate off site affecting public and neighboring facilities.	3	5	9	

System: 1. RAIL CAR OF SULFUR DIOXIDE
Subsystem: 1. RAIL CAR OF SULFUR DIOXIDE AWAITING UNLOADING

What ifs	Hazards	Consequences	S	L	RR	Recommendations
		4. Potential for the release to migrate off site affecting public and neighboring facilities.	4	5	10	
14. An airplane crashes into the rail car resutling in a release?	1. Potential release of sulfur dioxide into the atmosphere.	1. Potential for the release to migrate off site affecting public and neighboring facilities.	1	5	5	1. See the Recommendations in the Action Plan in Section 6 of this Plan.
		2. Potential property damage, environmental impact, regulatory impact, public relations impact.	2	5	8	
		3. Potential for the release to migrate off site affecting public and neighboring facilities.	3	5	9	
		4. Potential for the release to migrate off site affecting public and neighboring facilities.	4	5	10	
15. A weld or flange on a pipe fails resulting in a release?	1. Potential release of sulfur dioxide into the atmosphere.	1. Potential for the release to migrate off site affecting public and neighboring facilities.	3	3	7	1. See the Recommendations in the Action Plan in Section 6 of this Plan.
		2. Potential for the release to migrate off site affecting public and neighboring facilities.	4	3	8	
		3. Potential property damage, environmental impact, regulatory impact, public relations impact.	5	3	9	
		4. Potential for the release to migrate off site affecting public and neighboring facilities.	5	3	9	
16. A gauge fails resulting in a release?	1. Potential release of sulfur dioxide into the atmosphere.	1. Potential for the release to migrate off site affecting public and neighboring facilities.	4	3	8	1. See the Recommendations in the Action Plan in Section 6 of this Plan.
		2. Potential for the release to migrate off site affecting public and neighboring facilities.	5	3	9	
		3. Potential property damage, environmental impact, regulatory impact, public relations impact.	5	3	9	
		4. Potential for the release to migrate off site affecting public and neighboring facilities.	5	3	9	
17. The dome on the rail car fails resulting in a release?	1. Potential release of sulfur dioxide into the atmosphere.	1. Potential for the release to migrate off site affecting public and neighboring facilities.	2	3	6	1. See the Recommendations in the Action Plan in Section 6 of this Plan.

System: 1. RAIL CAR OF SULFUR DIOXIDE
Subsystem: 1. RAIL CAR OF SULFUR DIOXIDE AWAITING UNLOADING

What ifs	Hazards	Consequences	S	L	RR	Recommendations
		2. Potential for the release to migrate off site affecting public and neighboring facilities.	3	3	7	
		3. Potential property damage, environmental impact, regulatory impact, public relations impact.	4	3	8	
		4. Potential for the release to migrate off site affecting public and neighboring facilities.	5	3	9	
18. A gasket on a Sulfur Dioxide pump fails resulting in a release?	1. Potential release of sulfur dioxide into the atmosphere.	1. Potential for the release to migrate off site affecting public and neighboring facilities.	4	3	8	1. See the Recommendations in the Action Plan in Section 6 of this Plan.
		2. Potential for the release to migrate off site affecting public and neighboring facilities.	5	3	9	
		3. Potential property damage, environmental impact, regulatory impact, public relations impact.	5	3	9	
		4. Potential for the release to migrate off site affecting public and neighboring facilities.	5	3	9	
19. The pulsation dampener fails resulting in a release?	1. Potential release of sulfur dioxide into the atmosphere.	1. Potential for the release to migrate off site affecting public and neighboring facilities.	4	4	9	1. See the Recommendations in the Action Plan in Section 6 of this Plan.
		2. Potential for the release to migrate off site affecting public and neighboring facilities.	5	4	10	
		3. Potential property damage, environmental impact, regulatory impact, public relations impact.	5	4	10	
		4. Potential for the release to migrate off site affecting public and neighboring facilities.	5	4	10	
6. The railroad tracks over which the rail car of sulfur dioxide is moved is in poor condition?	1. No release is anticipated.	1. Potential exposure of employees in the immediate area.				3. See the Recommendations in the Action Plan in Section 6 of this Plan.
		2. Potential for the release to spread to other on site work areas with injuries to employees.				
		3. Potential property damage, environmental impact, regulatory impact, public relations impact.				

System: 1. RAIL CAR OF SULFUR DIOXIDE
Subsystem: 1. RAIL CAR OF SULFUR DIOXIDE AWAITING UNLOADING

What ifs	Hazards	Consequences	S	L	RR	Recommendations
		4. Potential for the release to migrate off site affecting public and neighboring facilities.				
20. A rail car is damaged due to severe natural events (tornado, hurricane, earthquake etc.)?	1. Potential release of sulfur dioxide into the atmosphere.	1. Potential exposure of employees in the immediate area.	1	5	5	2. See the Recommendations in the Action Plan in Section 6 of this Plan.
		2. Potential for the release to spread to other on site work areas with injuries to employees.	2	5	8	
		3. Potential property damage, environmental impact, regulatory impact, public relations impact.	3	5	9	
		4. Potential for the release to migrate off site affecting public and neighboring facilities.	4	5	10	
7. The ambient temperature is extremely hot or cold?	1. No hazard associated with this scenario.					

System: 1. RAIL CAR OF SULFUR DIOXIDE
Subsystem: 2. SULFUR DIOXIDE LIQUID SUPPLY LINE TO THE REACTOR

What ifs	Hazards	Consequences	S	L	RR	Recommendations
1. Rail car securement procedures are not properly conducted (chocks, brake set , flag, etc.)?	1. No release is anticipated.	1. Potential exposure of employees in the immediate area.				1. See the Recommendations in the Action Plan in Section 6 of this Plan.
		2. Potential for the release to spread to other on site work areas with injuries to employees.				
		3. Potential property damage, environmental impact, regulatory impact, public relations impact.				
		4. Potential for the release to migrate off site affecting public and neighboring facilities.				
2. The operator does not follow the air pad start up procedures (valves in the correct position)?	1. Potential release of sulfur dioxide into the atmosphere.	1. Potential exposure of employees in the immediate area.	4	4	9	1. See the Recommendations in the Action Plan in Section 6 of this Plan.
		2. Potential for the release to spread to other on site work areas with injuries to employees.	5	4	10	
		3. Potential property damage, environmental impact, regulatory impact, public relations impact.	5	4	10	
		4. Potential for the release to migrate off site affecting public and neighboring facilities.	5	4	10	

System: 1. RAIL CAR OF SULFUR DIOXIDE
Subsystem: 2. SULFUR DIOXIDE LIQUID SUPPLY LINE TO THE REACTOR

What ifs	Hazards	Consequences	S	L	RR	Recommendations
3. The operator fails to follow the liquid sulfur dioxide opening/closing procedures during start up, shut down and normal operations?	1. Potential release of sulfur dioxide into the atmosphere.	1. Potential exposure of employees in the immediate area.	4	3	8	1. See the Recommendations in the Action Plan in Section 6 of this Plan.
		2. Potential for the release to spread to other on site work areas with injuries to employees.	5	3	9	
		3. Potential property damage, environmental impact, regulatory impact, public relations impact.	5	3	9	
		4. Potential for the release to migrate off site affecting public and neighboring facilities.	5	3	9	
6. Rail car excess flow valve fails to close during another failure in the system?	1. Potential release of sulfur dioxide into the atmosphere.	1. Potential exposure of employees in the immediate area.	4	4	9	1. See the Recommendations in the Action Plan in Section 6 of this Plan.
		2. Potential for the release to spread to other on site work areas with injuries to employees.	5	4	10	
		3. Potential property damage, environmental impact, regulatory impact, public relations impact.	5	4	10	
		4. Potential for the release to migrate off site affecting public and neighboring facilities.	5	4	10	
7. The unloading lines fail (piping, fittings, valves, etc.) ?	1. Potential release of sulfur dioxide into the atmosphere.	1. Potential exposure of employees in the immediate area.	2	3	6	1. See the Recommendations in the Action Plan in Section 6 of this Plan.
		2. Potential for the release to spread to other on site work areas with injuries to employees.	2	3	6	
		3. Potential property damage, environmental impact, regulatory impact, public relations impact.	2	3	6	
		4. Potential for the release to migrate off site affecting public and neighboring facilities.	3	3	7	
4. The air dryer fails ?	1. No hazard associated with this scenario.					
5. The air pad system fails ?	1. No hazard associated with this scenario.					
8. The power fails ?	1. No hazard associated with this scenario.					

Risk Matrix

Likelihood					
	5	8	9	10	10
	4	7	8	9	10
	3	6	7	8	9
	2	4	6	7	8
	1	2	3	4	5

Severity

Severity Definitions:

Rank	Severity	Definition	
1	Serious	Worker	Fatality
		Public	Fatality
		Environment	Uncontrolled large release
		Property	Extensive damage (> $1M)
2	High	Worker	Disability / severe injury
		Public	Severe injury requiring hospitalization
		Environment	Moderate uncontrolled release
		Property	Severe damage/loss, extended downtime
3	Medium	Worker	Lost time
		Public	Medical attention/no hospitalization
		Environment	Small uncontained release
		Property	Downtime
4	Low	Worker	First aid/medical
		Public	Potential exposure
		Environment	Contained release/short duration
		Property	Potential downtime.
5	None	Worker	No medical
		Public	No exposure
		Environment	No significant release
		Property	No damage

Risk Matrix (continued)

Likelihood Definitions:

Rank	Likelihood	Definition
1	High	Possible, occurs frequently (1/month).
2	Moderate	Possible, occurs occasionally (1/year).
3	Medium	Possible, occurs under unusual circumstances (1/5 years).
4	Low	Possible, occurs rarely (1/30 years).
5	Very Low	Postulated event, not likely to occur (1/100 years).

Recommendation Guidance

Risk Rank	Suggested Mitigation Actions
1 – 2	Immediate action required.
3 - 8	Consider implementing recommendations.
9-10	No action is required.

Action Plan – Olympic Chemical Facility
Sulfur Dioxide
May 19, 2009

The final recommendations developed during the Sulfur Dioxide 5 Year Process Hazard Analysis (PHA) Review/Revision conducted ***May 19th, 2009*** are listed in this Action Plan. Please review each recommendation with respect to **Risk Rank** and **Suggested Mitigation Actions**. Each Process Hazard Analysis has **Recommendation** and **Risk Rank** is listed along with an area to assign an **Action Code**, an **Activity Description**, Assigned Person responsible for completion of the action, a **Projected Completion** date and an **Actual Completion** date.

Risk Rank	Suggested Mitigation Actions
1 – 2	Immediate action required.
3 - 8	Consider implementing recommendations.
9-10	No action is required.

Action Codes
N – No Action Planned
X – Implement Immediately
I – Implementation Scheduled (3 - 6 months)
B – Budgetary Approvals Required for Implementation

No.	Recommendation	Risk Rank	Action Code	Activity Description	Assigned Person	Projected Completion	Actual Completion
1	Consider hiring a full time Security Guard for the facility to monitor the Sulfur Dioxide rail cars during non business hours.	8	N	Hire a Security Guard.	Geoff Black	N/A	N/A
2	Consider contracting with an off site security monitoring service for Sulfur Dioxide rail cars during non business hours.	8	N	Contract with an off site security monitoring service.	Geoff Black	N/A	N/A
3	Consider modifying the existing on site monitoring system by installing a pan-tilt camera(s) on a telephone pole for a larger scope of viewing of the Sulfur Dioxide rail car.	8	N	Install pan-tilt camera(s).	Geoff Black	N/A	N/A